

# Business Line Crosslinkers

**Evonik**  
**Resource Efficiency Segment**

November 2015



**EVONIK**  
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# Evonik Group

## 22 Business Lines grouped in 3 segments



### Nutrition & Care



**Sales**  
€4,924 m



**Adj. EBITDA / Margin**  
€1,435 m / 29.1%

Animal Nutrition

Baby Care

Health Care

Personal Care

Household Care

Comfort & Insulation

Interface & Performance



### Resource Efficiency



**Sales**  
€4,279 m



**Adj. EBITDA / Margin**  
€896 m / 20.9%

Silica

**Crosslinkers**

Oil Additives

Coating & Adhesive Resins

High Performance Polymers

Active Oxygens

Silanes

Coating Additives

Catalysts



### Performance Materials



**Sales**  
€3,435 m



**Adj. EBITDA / Margin**  
€309 m / 9.0%

Performance Intermediates

Acrylic Polymers

Acrylic Monomers

Functional Solutions

Agrochemicals & Polymer Additives

CyPlus Technologies

## Business at a glance

Leading supplier and pioneer in isophorone chemistry



Top  
#1

only supplier in the world to  
produce and market the  
entire isophorone product  
chain

>50

years of experience in  
isophorone chemistry

>GDP

annual sales growth

\*3

value of the innovation  
pipeline more than tripled  
in the last 2-3 years

5

production sites worldwide

~700

employees worldwide

# Backbone and core competences of Crosslinkers

Evonik is the only company in the world to produce and market the entire isophorone product chain.

Product Line  
VESTASOL®

Product Line  
VESTAMIN®

Product Line  
VESTANAT® & Derivatives



## World market for...

Automotive Exterior



Powder Coatings



Industrial Coatings



PUR Dispersions



Automotive Interior



Composites



Chemical Synthesis

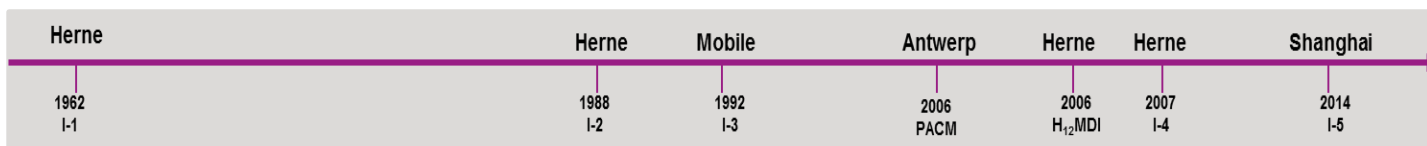
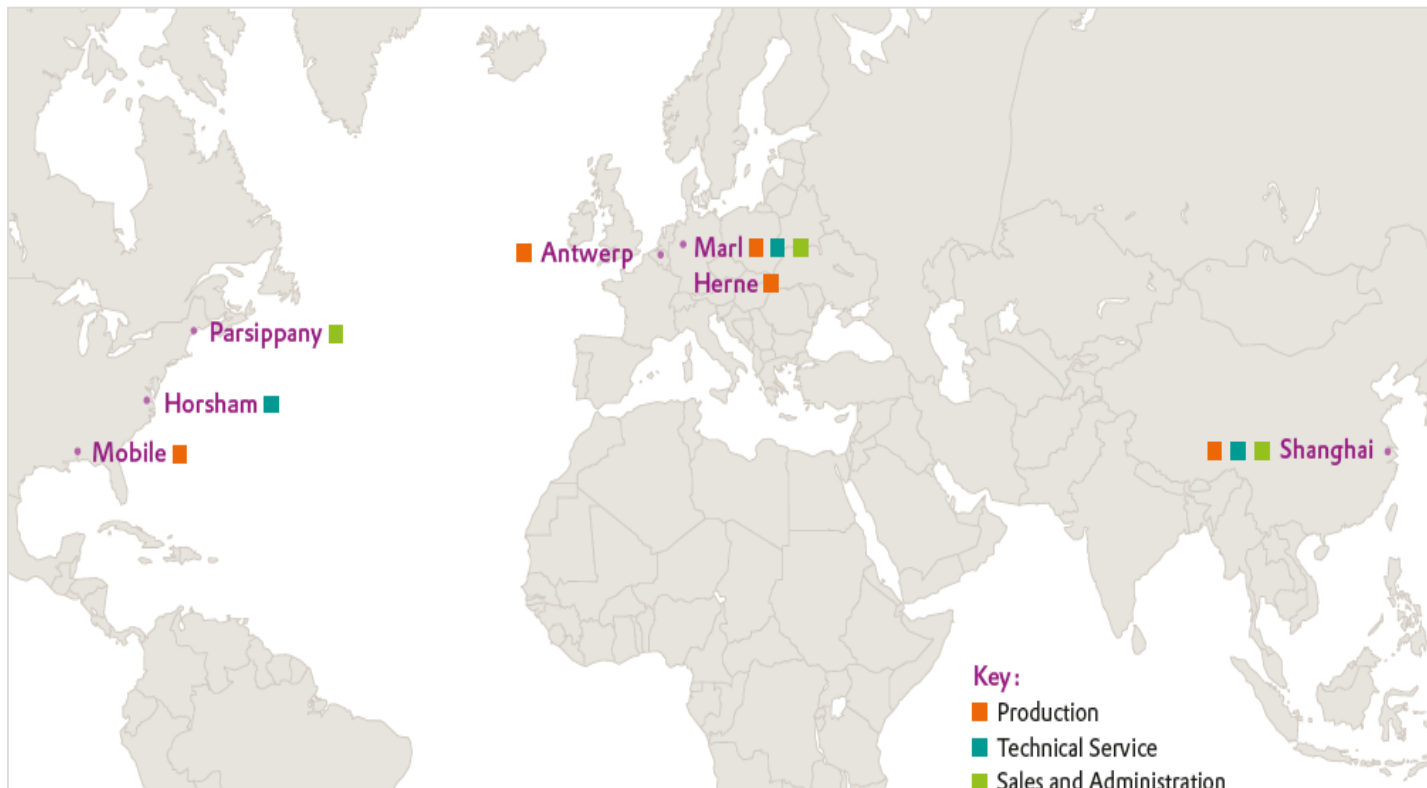


Specialty Solvents



# Global presence in Isophorone Chemistry established with commissioning of Marco Polo plant (China) in 2014

Evonik is the only fully integrated manufacturer in the triade with a long heritage in serving various industries and applications globally.



Marl



Herne



Mobile



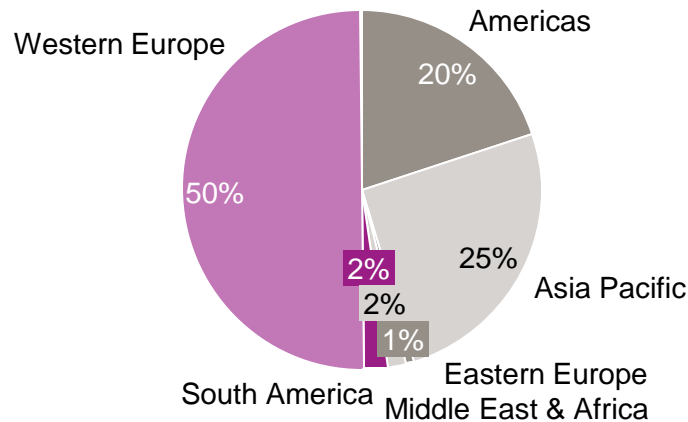
Antwerp



Shanghai

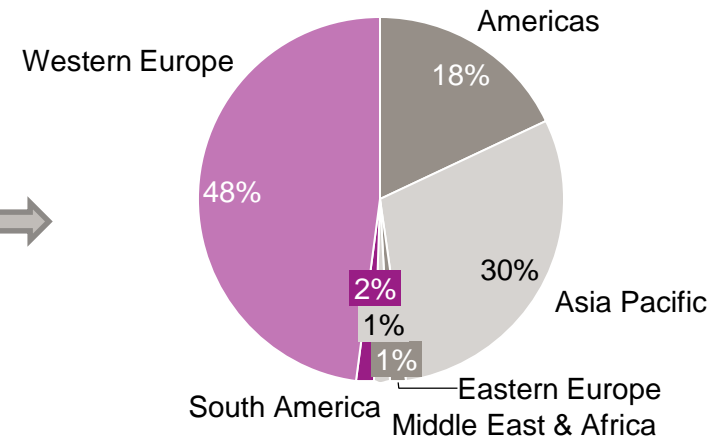
# Crosslinkers builds on major players in attractive markets and global market coverage

## 2009 sales volume by region [%]

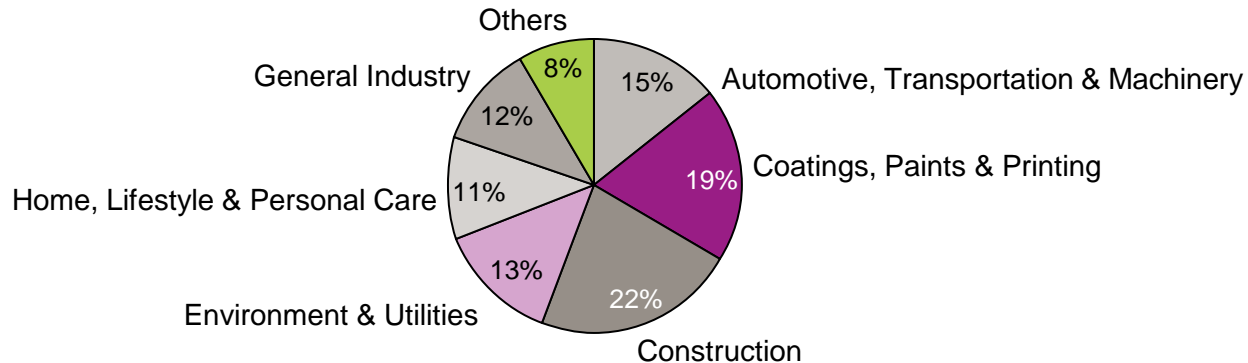


CAGR: 5,5%





## 2015 sales volume forecast by region [%]



## 2014 sales volume by market [%]



# Well known brands for high performance crosslinking

Product Groups	Brands	Products
Key ingredients for epoxy hardeners		IPD TMD PACM
Key ingredients for light stable PUR coatings & elastomers		IPDI, TMDI, H12MDI, T 1890, B 1358, B 1370, HDI Biured, HDI Trimer
Powder coatings, crosslinkers for exterior durable systems		B 1065, B 1400, B 1530 BF 1540, BF 1320, BF 1321, EP HA 368
Solvents & building blocks for chemical synthesis		IP, TMC-one, DHN, THN



### Main Applications



VESTASOL® for Printing Inks



VESTASOL® for Vitamin E



VESTASOL® for Sun Protection



VESTASOL® for Disinfectants



VESTASOL® for Polycarbonates



VESTASOL® for Crop Protection

### Characteristics

#### As solvent:

- Excellent dissolving power
- High boiling point
- Improves levelling
- Increases gloss
- Universal solvency

#### As specialty intermediate:

- Usage in different chemical synthesis routes (e.g. polycarbonates)
- Consolidated alternative to current synthetic routes (e.g. Vitamin E)
- Reliable raw material



## Main Applications



VESTAMIN® in windmills



VESTAMIN® for automotive composite



VESTAMIN® for flooring



VESTAMIN® in marine and protective coatings



VESTAMIN® for pipes

## New development

- Performance and process optimization in several composite applications
- Improved curing agent and matrix technologies
- Wide range of formulation developments for further enhanced curing performance in diverse applications

# VESTANAT® Aliphatic Diisocyanates

## Addressing the needs of the PUR resins industry

### Main Applications



VESTANAT® for wood



VESTANAT® for surface effects



VESTANAT® for TPU



VESTANAT® for leather

### New development

- Aliphatic diisocyanate for non-yellowing PUR elastomers and resins for coatings and adhesives
- Bifunctional building blocks, molecules unifying isocyanate and another reactive functionality (e.g. silane, unsaturation)

# VESTANAT® Derivatives

## Solutions for high performance liquid coatings

### Main Applications



VESTANAT® for 2K PUR coatings

November 2015



VESTANAT® for industrial coatings



VESTANAT® for automotive OEM

### New development

- VESTANAT® EP-M family (polyfunctional silanes) for scratch resistant OEM coatings and NISO systems (ambient temp. cure)
- VESTANAT® B 1186 for FDA compliant interior can coatings
- VESTANAT® EP-HP (hydrophilically modified polyisocyanates) for waterborne 2K systems
- VESTANAT® EP-DS 1205 TF (tin free blocked crosslinker) for waterborne coatings
- Carbodiimides for crosslinking and stabilization of polyesters

# Crosslinkers growth objectives

- Maintain position through timely expansions
- Portfolio management based on core competences
- Focus on eco friendly products
- Further enhance regional presence in the triad
- Focus on partnerships with top performers

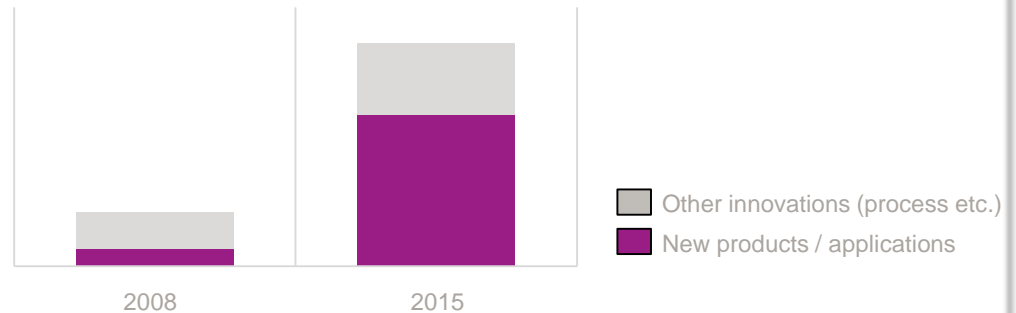


## Established business

- Production unit in the triade
- Customers proximity
- Joint development projects with Key Customers
- Key Account Management system with tailored packages
- Composite Rebars
- Low temperature curing hardeners
- General trainings for skill sets in marketing & sales, development of young professionals

## Portfolio development

- Strong increase of new ideas in the development pipeline for new products and applications



- What we are proud of



### ADAMANT

- ▶ High performance scratch resistant clear coat
- ▶ From first idea to test-coated luxury cars in just 3 years!



### PU-PrePreg

- ▶ Pre-impregnated composite fibers
- ▶ Intensifying contacts to OEMs and Tier1



# Customers benefiting from CL as leader in isophorone chemistry with global presence

## VESTA

Developed in Germany. Available globally.

- Over 50 years of experience
- Average growth 4 – 6% over more than 20 years
- **Only manufacturer of products of the entire isophorone chain**
- Production facilities in Europe, Nafta & Asia
- Demanding high technology processes
- High performance materials for diverse markets & industries
- Applied technology centers in Germany, USA & China
- Technical and market experts focused on developing innovative solutions
- Focus on developing next generation product solutions with customer
- Focus on growth in modern applications, e.g. composites





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# Reaction scheme Isophorone chemistry

## Isophorone Chemistry

